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SAMUEL HUBBARD SCUDDER.

By J. S. Kingsley.

The Scudders are an old New England family with its center at Barnstable, on Cape Cod. Samuel Hubbard Scudder, the son of Charles and Sarah Lathrop (Coit) Scudder, was born in Boston, April 13, 1837. He received his early education in the Boston Latin School and then, like two of his brothers, entered Williams College, graduating from there with the class of 1857. David Coit Scudder, of the class of 1855, became a missionary to India and was drowned a few years after taking up his work. Horace Elisha Scudder, of the class of 1858, was a man of letters and was for some time the editor of the *Atlantic Monthly*. A third brother, Charles, was long prominent in business in Boston, being for years treasurer of the Massachusetts Institute of Technology and of the Boston Society of Natural History.

The incentives to a scientific life were at that time great at Williams—probably as great as at any other American College. Ebenezer Emmons, the eminent geologist, was in charge of the instruction in natural history, while Albert Hopkins, the intellectual peer of his better known brother, was a most enthusiastic student of nature. Then there was a student scientific society, the Lyceum of Natural History, founded in 1835, which was accumulating a library and a museum. This had a great influence on Scudder as it has on a long series of students who have aided in the development of American science.

One of the early works of the Lyceum was the preparation and publication of a catalogue of the local fauna and flora. To this catalogue, one of the rarest of American natural history papers, Scudder contributed the list of molluscs of the neighborhood of Williamstown. He also was of great assistance in the preparation of other parts of the lists.

Scudder had decided, before leaving college, to devote himself to entomology, and with that end in view he went to Cambridge to study with Agassiz, then in his prime. He has published an account of the way the master began with him, and this has been reprinted many times. As a preparation for the study of insects the master set him at work at fishes. First he had to study a single specimen, day after day, with no other aid than his eyes. Then came the study of related forms and the beginning of a monograph of the group of Serranids, which, however, was never published. This account is still of great value as showing the pedagogic methods of one of the great teachers, described in the most charming manner.

The study with Agassiz continued, with interruptions, until 1862 when he received the degree of bachelor of science from the Lawrence Scientific School of Harvard. Then followed an appointment as assistant to Agassiz, which continued until 1864. In 1862 he also became the secretary of the Boston Society of Natural History, and when he left Agassiz it was to become also the custodian of the Boston Society. He continued to hold both offices until 1870.

From 1870 to 1879, when he became assistant librarian of Harvard University, he held no official position. In 1882 he was elected president of the Boston Society of Natural History and was annually reëlected until 1887, when he refused to hold the office longer. The position in the Harvard library was resigned in 1882. In 1886 he was appointed paleontologist of the U. S. Geological Survey, with especial charge of the work upon fossil insects, the position being held until 1892. After that date he refused all official positions and, until stricken with the disease which, after years of suffering, caused his death, he devoted himself to his insect studies. His library and collections grew too large and too valuable to be longer accommodated in his house. So he built a large and attractive study in the yard, which formed their home as well as the meeting place of the Cambridge Entomological Club, as long as he was able to work.

Of his entomological work others will write in this number of Psyche. His general publications were comparatively few. Among them are to be enumerated that extremely useful work, the Catalogue of Scientific Serials (1879), that enormous task, the Nomenclator Zoologicus (1884) and an account of an early trip into the Winnipeg Country with one of the eclipse expeditions, which first appeared as by "A. Rochester Fellow" but soon was acknowledged as his production. Here may also be mentioned his many contributions to Appalachia, dealing with outdoor life and adventure.

Scudder had the ability to recognize scientific needs and to start the machinery for meeting them. Thus as much to him as to any one was due the formation of the Cambridge Entomological Club and the establishment of this journal. He was also the leading spirit in the organization of the Appalachian Mountain Club. He and Edward S. Morse established the Boston Naturalists' Club, unique as being without a constitution and in having but a single officer. This club, which is still flourishing, has entertained every naturalist of note who has visited Boston since 1869.

Especial emphasis should be laid on his connection with the periodical 'Science.' There had been a struggling and jejune journal with that name but Scudder was able to interest some wealthy men in the project of a weekly scientific newspaper which should adequately represent all departments of science. So the old journal was bought, so as to control the name, and the new one was started, with Scudder as chief editor, in 1883. It was ably edited and rejoiced the hearts of the scientific men of the day. It began by paying for all contributions and soon exhausted its guarantee fund; there were not subscribers enough to pay the expenses and no one thought of the later expedient of making it the organ of some large association. So, after two years in the editorial chair, Mr. Scudder dropped out. The scientific public was not large enough and the general public would not support the journal, so, after lingering along for a few years it died.

So much for an outline of the scientific life of Dr. Scudder. There is a personal side which was far more interesting to those who were privileged to know him. I became acquainted with him in 1874, while I was a junior in college. He returned in that spring to his alma mater and, as he was the first active, publishing zoologist I had ever met, I must have made life a burden to him. Yet he was most helpful and suggestive and answered my every question with the utmost patience. Later, I came into more intimate connection with him when he was at work at his fossil myriapods and insects, as I was employed to draw many of these forms. Among these were numerous fossil cockroaches. Often these had all four wings superimposed and the difficulties of working out the nervures in each separate wing were great. When my drawings came to him for criticism, I was astonished, again and again, at his extreme accuracy; a vein a hundredth of an inch from its proper position was always noted.

Another characteristic was a quiet humor; witness his selection of the lines from the "Dunciad" which appears on the title page of his Nomenclature Zoologicus:

> Index learning turns no student pale
> Yet holds the eel of science by the tail.

Then there was the case of the hairy fossil which he regarded as a myriapod and described as Trichiulus. Later he came to believe that he had been deceived by a bit of a fern, and I recall the way in which he said that the name selected was indicative of his error; he should have spelled it Tricky Iulus.

Scudder was most helpful to young naturalists. He could always find plenty of time to aid them over their difficulties. Specimens would be brought out, books hauled down and all of his rich stores of knowledge called upon. In larger affairs his judgment was always good and he bore a large part in all of the societies with which he was connected.

There were many sorrows in his life. Married in 1867 to Miss Jeannie Blatchford, they had one of the most charming of homes in Cambridge. But soon the wife sickened. The Riviera was visited in search of health but in vain, and she died when the only child, Gardner Hubbard Scudder, was a small boy. The boy grew up, graduated at Harvard and Harvard Medical School, and began work as an intern in the hospital, when he was attacked by an infectious disease to which he succumbed at the very outset of his active life. Then came, about 1896, the first stages of the disease which was to continue through his life, increasing gradually in severity, until, in a few years, all work was impossible and friends could be allowed but two or three minutes' conversation with him. He realized his condition, knew that his work was done, and so he gave away his collections and library and patiently waited for the end. His collections went to the Museum of Comparative Zoology; his library to the Boston Society of Natural History, those that were duplicated there passing to Williams College. At last, on May 17, 1911, he was relieved from his sufferings.

DOCTOR SCUDDER'S WORK ON THE LEPIDOPTERA.

By William L. W. Field,
Milton, Mass.

Doctor Scudder's monumental work on "The Butterflies of the Eastern United States and Canada" was the culmination of more than thirty years of research in the life-histories and affinities of the higher Lepidoptera. After its publication, in 1889, his attention was largely given to the study of fossil insects and of Orthoptera, though he nevertheless found time for the preparation of several books designed to cultivate popular interest in the butterflies. Indeed he had in mind the publication of a book of wide scope,—a manual of the butterflies of North America. Great would have been the gain to the science of entomology had he lived to carry out his plan.

Few writers upon the Lepidoptera have approached him in philosophic breadth of view, in felicity of expression, in taxonomic precision. Perhaps no other has possessed these qualities in such wonderful combination. The spirit of Louis Agassiz, whose pupil and assistant he had been, is in his systematic work—the spirit which lays deep and sure foundations for the generalizations that are to come. "Facts are stupid things," he quotes his great teacher as saying, "until they are brought under some general law"; but he himself shows, all unconsciously, that the scientist's prevision of the light that will illuminate his facts invokes a lustre from the facts themselves. Comparisons of structural details in closely-allied insects are apt to make dull reading; but those from his pen have something which redeems and individualizes. We see, beyond the printed page, the ever-fresh zeal of the investigator.

And into the generalizations enters a new spirit—that of Charles Darwin. Doctor Scudder's essays upon migration, geographical distribution, protective coloration, dimorphism, and other evolutionary aspects of butterfly life, pointed the way to broad fields for research among our native species. These essays, most of them placed as "excursi" between the accounts of different families and genera in his great monograph, are perhaps the most widely read of all his writings. Some of them were reprinted, a few years ago, in the little volume entitled "Frail Children of the Air." One, which did not find a place in the smaller collection, but which is regarded as a classic by students of zoögeography, is called "The Spread of a Butterfly in a New Region." It gives a detailed history of the invasion of North America by *Pieris rapae*.

"The Life of a Butterfly," a little monograph of *Anosia plexippus*, was published in 1893. The influence of this book is seen in the almost unanimous adoption of *plexippus* as the "typical butterfly" by teachers of elementary zoölogy in American schools.

Though mainly interested in the careful working out of life-histories, and their application to the solution of ontogenetic and phylogenetic problems, Doctor Scudder was the author of the first descriptions of some thirty species of American butterflies. His studies in classification were far-reaching. It is perhaps because these studies led him, in some instances, a long way from the beaten track of earlier monographers, that his popular manuals have not been so generally used as their author hoped they might be. But among men of learning his conclusions gained wide acceptance and support; and as time goes on, and students of heredity and evolution learn to make use of the wealth of material which the butterflies afford for their investigations, new cause will appear for grateful remembrance of his thorough and critical survey of the ground.

In all his published works, but more especially in those dealing with the Lepidoptera, Doctor Scudder showed the qualities of the real naturalist. Like Darwin, going again and again to watch the Bryony buffeted by the gale, he was ever revisiting the haunts of particular butterflies, and amending or confirming, by patient observation, his accumulated data. So the breath of outdoors is in his writings, and the eagerness of the explorer was in his spoken words; and the sight of the autumnal flocks of the Monarch, or the feeble flight of *Oeneis* about leeward ledges, must always recall to us their greatly gifted interpreter.

SCUDDER'S WORK ON FOSSIL INSECTS.

By T. D. A. Cockerell,

The University of Colorado, Boulder, Colo.

Scudder was the founder of American Palæoentomology, and by far the largest contributor to the subject. He described over a thousand species, ranging from the Carboniferous to the Quaternary, covering a much larger field than any of his successors in this country. His great knowledge of living insects, and broad grasp of biological problems, especially fitted him for this work, while the discovery of some extraordinarily rich deposits gave him unusual opportunities. It is true that some recent writers have felt obliged to disagree with certain of Scudder's conclusions, but considering the difficulty of the subject, it cannot be doubted that he did excellent work; nor is it by any means certain that all the revisions of later years will be found valid. When we compare Scudder's work with that of European palæoentomologists, we are struck by the methodical and detailed descriptions of his species, the frequent synoptic tables, and the abundant illustrations. We are impressed by the idea that he always did his best, and did not willingly or intentionally leave things in a confused or imperfect state. The European literature, while containing much fine work is full of scrappy descriptions or mere allusions, which are worse than useless. Even Handlirsch, the most eminent living authority, does not hesitate to publish such descriptions (without figures) as this: "*Gryllacris* (s. 1.) *Kittli* m. Fundort: Radoboj, Kroatien. Unteres Miocän. Das Wiener Hofmuseum besitzt ein exemplar, welches ähnliches Geäder zeigt wie *Ungeri;* und *brevipennis,* aber nur 28 mm. lange Vorderflügel besitzt." This sort of thing has never been customary in this country, and consequently our literature is not crowded with names which are almost or wholly meaningless unless one has access to the types on which they were founded. Whenever Scudder's species are obscure, it is because they are based on obscure specimens, and in some cases we are obliged to admit that he used too imperfect materials for descriptions.

Scudder not only made himself familiar with American fossil insects from all horizons, but examined European collections, visited some of the classical localities, and published descriptions of a number of new European species.

Scudder's first paper on fossil insects, published in 1865, related to those ancient forms from New Brunswick, considered by many Canadian geologists to be of Devonian age, but on the evidence of the accompanying fossil plants, referred by David White and Kidston to the Carboniferous. In time, his work on Palæozoic insects assumed large proportions, nearly two hundred species being described. In Scudder's opinion, the Palæozoic insects were not separated into orders like those of the present day, but nevertheless could be divided into groups which more or less resembled modern orders. It was not that the Palæodictyoptera were characterized by any very marked ordinal characters, but they lacked the special features which distinguished the living groups. Even in the case of the Palæozoic cockroaches, Scudder thought that they should be separated from the true Orthoptera, though certainly ancestral to them. These Palæoblattariæ were supposed to be exclusively Palæozoic, until numerous species were found in the "Trias" of Colorado. In the opinion of David White, however, the so-called Triassic beds at Fairplay are not later than Permian, "if indeed they are above the highest Coal measures," and consequently are Palæozoic.

These opinions of Scudder's have given rise to some controversy, and today few would maintain the all-inclusive "Palæodictyoptera" in the sense of Scudder. The following table contrasts Scudder's arrangement of the Palæozoic insects with the most modern, that of Handlirsch:

HANDLIRSCH	SCUDDER
Order Palæodictyoptera.	Palæodictyoptera in part.
Dictyoneuridæ.	Orthopteroidea Protophasmida.
Lithomantidæ.	Neuropteroidea Hemeristina. " Homothetidæ.
Lycocercidæ.	N.* Palephemeridæ (?)
Homothetidæ.	N. Homothetidæ.
Breyeriidæ.	O. Protophasmida.
Brodiidæ.	N. Hemeristina.
Paoliidæ.	O. Protophasmida.

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*N. =Neuropteroidea; O. =Orthopteroidea.

Order Mixotermitoidea		N. Homothetidæ.
(?) Order Reculoidea.		(Unknown to Scudder).
Order Protorthoptera.		
	Spaniodéridæ.	N. Palæopterina.
	Pachytylopsidæ.	N. Hemeristina.
	Œdischiidæ.	N. Homothetidæ.
	Geraridæ.	N. Gerarina. N. Homothetidæ.
Order Protoblattoidea		N. Gerarina N. Palæopterina include genera placed by Handlirsch as uncertain Protoblattoidea.
	Protophasmidæ.	O. Protophasmida.
	Oryctoblattinidæ.	Hemipteroidea. O. Blattinariæ.
	Ætophlebidæ (rect. Æthophlebidæ).	N. Palæopterina.
	Cheliphlebidæ.	N. Homothetidæ.
	Eucænidæ.	N. Homothetidæ.
	Gerapompidæ.	N. Homothetidæ.
	Adiphlebidæ.	N. Gerarina
	Anthrocothremmidæ.	N. Homothetidæ.
Order Mantoidea* (includes living Mantidæ).		(Unknown to Scudder as Palæozoic.)
Order Blattoidea* (includes living Blattidæ).		
	Archimylacridæ.	O. Blattinariæ.
	Spiloblattinidæ.	O. Blattinariæ.
	Mylacridæ.	O. Mylacridæ.
	Neorthroblattinidæ.	Neoblattariæ (includes modern cockroaches).
	Poroblattinidæ.	O. Blattinariæ.
	Mesoblattinidæ.	Neoblattariæ.
	Diechoblattinidæ.	Neoblattariæ.
	Proteremidæ.	O. Palæoblattariæ.
Order Hadentomoidea.		(Unknown to Scudder.)
(?) Order Hapalopteroidea.		(Unknown to Scudder.)
Order Perlaria.*		(A Permian genus unknown to Scudder provisionally placed here.)
Order Protodonata.		
	Meganeuridæ.	N. Palephemeridæ. O. Protophasmida.
	Paralogidæ.	O. Protophasmida.
Order Protephemeroidea.		(Not considered by Scudder.)
Order Plectoptera.*		(Three genera of Russian Permian, unknown to Scudder.)
Order Megasecoptera.		Neuropteroidea.
Order Protohemiptera.		Hemipteroidea.
Order Palæohemiptera.		(Unknown to Scudder.)

Orders still living are marked with an asterisk. It will be seen that Scudder admitted some of the cockroaches into the group still living, but these genera were supposed by him to be later than Palæozoic. On the other hand, Handlirsch, if we except genera unknown to Scudder, places only the cockroaches in a modern order. The main issue therefore narrows down to (1) Whether the Palæozoic cockroaches in general, or only some of them, should be placed in the same order as the living ones, and (2) whether among the Palæozoic insects excluded from modern orders, we should recognize one order or many. Even so, the disagreement diminishes when we note that Scudder opposed his Palæodictyoptera to a group of equal rank including all other insects, and divided it up into sections which he considered related to the modern Neuroptera, Orthoptera and Hemiptera. To a considerable extent the apparent difference is due to different conceptions of what constitutes an order; thus Handlirsch makes several orders out of the living Orthoptera, usually considered to be one. In detail, there is more serious disagreement as to the placing of various genera, and since many of these are known from very unsatisfactory fragments, it is likely that diverse opinions will prevail in the future as in the past. If many writers, for reasons of convenience, adopt throughout the nomenclature of Handlirsch's great work, this will not necessarily imply critical judgment between opposing opinions. In this comparison, the data from Scudder are taken from his summary published in 1886, with some additions from later works.

Since Handlirsch published his classification, Sellards has made known a magnificent series of insects from the Permian of Kansas. In connection with a very large and well-preserved dragon-fly, he discusses the standing of the Protodonata, and arrives at the conclusion that they should rank as a sub-order only, under Odonata. Sellards also reports from these deposits a series of ten genera and thirteen species of Plectoptera (Ephemerids), forming a new family Protereismatidæ (Protereismephemeridæ, Sellards). Summing up, we may consider the following propositions valid, so far as present knowledge goes:

(1.) During the later Palæozoic the Blattoid Orthoptera were well established, and in the latest Palæozoic (Permian) the Ephemerids, and possibly the Perlids and Mantids, had become sufficiently differentiated to be placed in the same orders as their living representatives.

(2.) For the rest, the Palæozoic insect fauna was too primitive to be placed in existing orders, and was undoubtedly far more homogeneous than the fauna of any later epoch. Whether it should be regarded as a single great group (contrasted with a group including all living insects), divided into several "sections," or should be divided into a number of orders, depends principally on one's conception of the limits of an "order." Even Handlirsch does not insist upon the recognition of all his "orders," but expressly states that several of them are provisional. It must also be said that one who felt convinced that numerous valid orders of insects really did exist in the Palæozoic, might nevertheless hesitate to recognize ordinal divisions made so often in ignorance of the metamorphoses, mouth-parts, and other matters considered of prime importance in classification.

Scudder described six species from the Lias of England; four are Blattoids, and two (according to Handlirsch) Prohemerobiid Neuroptera. Twenty-three Blattoids were described from the English Purbeck, which Handlirsch treats as uppermost Jurassic, but A. S. Woodward as lowermost Cretaceous. *Hylobiites cretaceus* Scudder was founded on a fragment of an elytron from the Pierre Shales (Montana Cretaceous) of Manitoba,—a quite unexpected discovery, the Pierre being marine. *Corydalites fecundum* Scudder is a name for egg-masses found in the Laramie beds of Colorado.

The 838 Tertiary insects described by Scudder, principally in his great work "The Tertiary Insects of North America" (1890), represent only a portion of those he accumulated and studied. There are in the Museum of Comparative Zoölogy at Cambridge very numerous specimens representing undescribed species, which Scudder intended to make known. Some of these have been published in later years by other writers, and many others will eventually be described. It is greatly to be regretted that the Museum of Comparative Zoölogy has never felt able to put a series of Scudder's Tertiary insects on exhibition; they are many of them so beautiful and so well-preserved, that they would excite the interest of all visitors, and no doubt some would be led to take up this neglected branch of entomology. The British Museum, having a much smaller collection from the American Tertiaries, has hastened to exhibit them to the best possible advantage.

The work on Tertiary insects was largely based on specimens from Florissant, Colorado, where Scudder himself made a very large collection. He also collected from the White River deposits on the Colorado-Utah boundary, and visited Œningen, the famous locality in Baden which may be said to represent Florissant in Europe. Scudder's writings on Tertiary insects are so voluminous that it is hardly practicable to review them in this article; but attention must be called to the fossil butterflies from Florissant and from Aix in France, and to the great work on the Rhynchophora. In the course of the work, various important generalizations were made; these are now familiar to entomologists, and need not be discussed in this place. The detailed descriptive work, however, has not received the attention it deserves, and monographers of groups of living insects cannot be too strongly urged to examine Scudder's writings, which will undoubtedly throw important light on problems of descent, and especially on the migrations of faunæ.

Scudder took great interest in the Quaternary insect-fauna, describing 80 species of beetles from the Postpliocene and Interglacial deposits of Canada, and three from Massachusetts. This work was important in a number of ways, but perhaps most of all as indicating the approximate rate of the evolution of species in insects, proving that Coleopterous species, at least, are much less permanent than those of plants.[1] On the other hand, it is seen that the specific changes taking place are comparatively insignificant, and that for generic differentiation in insects, long periods are usually required. From the Tertiary and Quaternary work we conclude that in the rate of evolution, insects stand between flowering plants and vertebrates.

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[1] A very exact study of the preglacial flora of Britain was published by C. and E. M. Reid in 1908 (Journal of the Linnean Society, Botany). It was found that of 147 species, nearly all were living, but a few apparently extinct.

THE ORTHOPTEROLOGICAL WORK OF MR. S. H. SCUDDER, WITH PERSONAL REMINISCENCES.

By Albert P. Morse,

Wellesley, Mass.

In March, 1861, there appeared in the Proceedings of the Boston Society of Natural History a brief paper of nine pages "On the genus Rhaphidophora Serville, with descriptions of four species from the caves of Kentucky and the Pacific Coast," by Samuel H. Scudder of Cambridge and Boston. This was the first paper on orthoptera published by Mr. Scudder. It was followed in November of the succeeding year by an article of 80 pages in the Boston journal of natural history entitled "Materials for a monograph of the North American orthoptera, including a catalogue of the New England species," which treated of 115 species, including 78 from New England. For forty years from that date, until 1902, when Mr. Scudder definitely abandoned scientific work in consequence of increasing physical infirmities, he was *facile princeps* of American authorities on orthoptera and one of the foremost in the world, a position due primarily to great natural ability and excellent equipment fortunately associated with adequate time and means to seize the opportunities presented.

I have been unable to learn what particular reason led him to choose this group of insects for special study; but it is evident from the preface of the "Materials" that even at that date he had acquired considerable collections and had devoted much study to the group.

A few short papers on the order came from him during the next five years and in 1868 appeared his "Catalogue of the Orthoptera of North America described previous to 1867," a work of 110 pages including an extensive bibliography, prepared for and published by the Smithsonian Institution;—this work formed for many years a point of departure for students of the group in America. From this time until 1880 his activity in study and publication on the order was very great, papers appearing in rapid succession, on a wide variety of topics—descriptive, systematic, anatomical, and biological, including stridulation and distribution. Between 1880 and 1890 his energies were devoted chiefly to other groups and subjects—fossil insects, and the preparation and publication of his great work on butterflies—but for the ten years from 1891 to 1901 his orthopterological activity was incessant, resulting in nearly 70 titles in the order, including months of work on the "Revision of the Melanopli," and terminating practically with the preparation, jointly with Professor Cockerell, of the "First list of the orthoptera of New Mexico." Would that his strength might have been as were his days, that he might have been spared the afflictions of his later years: how much more he would have given us!

It would be superfluous to name here even the more important of his systematic papers—every student of the order in America is acquainted with them perforce and a full bibliography up to the end of 1900 will be found in his "Index to North American orthoptera" (Occas. papers Boston Soc. Nat. Hist., Vol. 6, 1901) which is practically a bringing-up to the end of the century of his "Catalogue" of 1868. Mention should be made in this connection, however, of his "Catalogue of the described Orthoptera of the United States and Canada" (Proc. Davenport Acad. Nat. Sci., Vol. 18, 1900) which is a list of the species described up to that time; also to the scholarly "Revision of the Orthopteran group Melanopli," a work already alluded to, which involved a prodigious amount of labor and brought something like order out of the chaos which prevailed at the time in reference to this dominant group of North American Orthoptera; and also to the "Guide to the genera and classification of North American Orthoptera," a most useful aid to the student of the order.

His studies were not confined solely to the North American members of the order but extended to those of all parts of the world. One hundred and twenty-two foreign species were described by him in his earlier period of activity ("List of exotic Orthoptera described by S. H. Scudder, 1868–1879," etc.,—Proc. Boston Soc. Nat. Hist., Vol. 27, pp. 201–218) and in later years the orthoptera of the Galapagos Islands and the Melanopli of the Old World and of South America received his attention.

Mr. Scudder did relatively little field work and that chiefly in his earlier years; but that he was equally at home in the field as in the laboratory is fully attested by his notes on the distribution and stridulation of the orthoptera and the habits of butterflies. Throughout his writings, from the earliest period to the very latest, it is evident that the biology and distribution of these insects appealed strongly to him; two special papers only need be mentioned in this connection: "The distribution of insects in New Hampshire" and "Alpine Orthoptera." His last and most complete article on stridulation will be found in the 23d annual report of the Entomological Society of Ontario (1893), being practically a revision of his earlier papers combined with subsequent observations.

Mr. Scudder's systematic articles on orthoptera were written from the point of view of the specialist, and for specialists, and in the absence of an adequate technical introduction to the order are sometimes difficult for the unaided student. It is to be regretted that he did not prepare such an introduction as is needed to fill the hiatus between the novice and the expert.

In systematic work he was often too far in advance of his time for his views to be popular or fully appreciated by his contemporaries. This was notably the case in the Lepidoptera where his apparently undue splitting-up of genera seemed to them unjustifiable, his discrimination of species being more generally recognized. Yet today his views on genera are largely accepted. The publication of his North American Ceuthophili with its wealth of new species caused a gasp of protest at standards called "Scudderian," yet there are probably even more species in the group than were recognized by Mr. Scudder. In the Orthoptera I have often thought that his judgment on genera was more accurate than on species, both in his earlier and later works. In estimating species he was more likely to describe the same one twice without apparent justification than to fail in detecting a new form, but there are occasional instances of tangled nomenclature due to the latter type of error.

The material which Mr. Scudder studied came to him from various sources: a limited portion was collected in person, particularly most of his early New England specimens; a part was acquired by purchase and exchange—by these means he secured much from foreign localities as well as from the west; another part was obtained by acting as official expert in reporting upon the specimens collected by the government surveys of the western territories; and finally, in later years, gifts, exchanges, and loans from his colleagues supplied him with a large amount. Being for many years almost the only authority on the group he was naturally the recipient of a very large proportion of the new forms discovered, so that his collection inevitably became, with his continued activity and relative absence of competitors, extremely rich in types. It needs revision in many particulars, still contains much unworked material, and is losing its relative importance owing to the cessation of activity directly connected with it and the development of collections elsewhere, but historically it must remain a most important collection of American Orthoptera.

Mr. Scudder worked rapidly—too rapidly for accurate results sometimes; but in no other way could he have accomplished so much. Once, on remarking to him in connection with some of my own studies that if one worked rapidly he was liable to make errors, he rejoined with emphasis, "Sure to, sure to!" In the early period of his activity he was perhaps prone to draw conclusions from too limited a supply of material, but that was the custom of the time quite as much as of the man. In later years, with long series before him, he often worked with selected examples of the species he had tentatively discriminated, instead of with the series as a whole. This method, though economizing time, provided the possibility of numerous errors, from which he did not wholly escape. No one, however, was ever more ready to acknowledge and rectify mistakes when called to his attention.[1]

Mr. Scudder frequently said that he was unable to draw, and regretted his inability to express by this means the characters which he observed. Perhaps the fact that he felt a difficulty, thus acknowledged, may account in part for that experienced by others in following some of his work.

No systematist can judge correctly the work of another without actually studying the material upon which his conclusions were based and bearing in mind his experience and personal knowledge at the time. It is a genuine pleasure to follow a great leader, one masterly in execution, inspiring in word and deed; but in science—the pursuit of truth—it must not be done blindly, it is necessary to preserve an unbiased attitude and accept or reject conclusions independently.

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[1] It seems well to take this opportunity to correct the erroneous measurements of certain species described by Mr. Scudder in his "Materials" which have caused much perturbation among later workers. He once told me that in measuring he then used a scale other than the inch, which needed correction to give the right dimensions. Some of the figures failed to receive correction and need to be multiplied by two to give the right measurement. (See ***Gryllus*** spp., *Tettix triangularis*.)

Personally Mr. Scudder was the highest type of a scholarly gentleman: a broad-minded, dignified, cultivated, courteous savant, in whom were united the finest attributes of the scholar and man of science; yet genial withal, and most kind and helpful to the inquiring student. Well do I remember the cordial welcome he extended to me, an unknown quantity, in response to the rat-a-tat of his laboratory knocker,—that quaint conceit, a knocker in the form of a locust, beating upon the door with its hind legs!—when I first called upon him, as well as the many delightful hours spent there afterward in the study of his collection. His unrivaled library, rich in everything entomological and as complete as possible in his specialty; his collection, unequaled in America, containing specimens from the ends of the earth; and most of all the man himself, well-versed in many branches of the science, made his laboratory the Mecca of every entomologist, resident or migrant, native or foreign.

In those days (the 90's) the Cambridge Entomological Club met there, its members few but determined to keep the lamp alive and maintain the high traditions of an earlier time. Mr. Scudder was a host in himself; Roland Hayward, now with the great majority, was very regular in attendance; Mr. Henshaw came frequently, less often in the later years; Messrs. Bowditch and Emerton, still with us, occasionally appeared; rarely, birds of passage visiting the Museum of Comparative Zoölogy or Mr. Scudder himself, among them Dr. Geo. H. Horn, Prof. Lawrence Bruner, and other entomologists of note; and among the younger men, while resident in Cambridge, I recall especially J. W. Folsom and W. L. Tower, both of whom have since made their mark.

This period was at the flood tide of Mr. Scudder's productiveness on the orthoptera. Never a meeting passed but that he had something to communicate;—additional or newly worked material, new discoveries based on his studies, or notes of interest gleaned from his wide reading of entomological literature. Those were indeed, golden days

> "When every morning brought a noble chance, ·
> And every chance brought out a noble"

theme from Mr. Scudder's pen.

In the spring of 1897 Mr. Scudder made a proposal which led to my spending the summer on the Pacific Coast in search of the Orthoptera of that region. On the way out I stopped for a few days in southern New Mexico with Professor Cockerell and collected there. The material thus secured, amounting to several thousand specimens, was shared between us, the bulk of it remaining in my collection, but was determined almost wholly by Mr. Scudder, though the Xiphidiini and Tettiginæ were worked up by me at his special request. No report on the collection as a whole has ever been prepared but upon it were based in large part a series of short papers by Mr. Scudder during the late 90's, papers which form a very considerable contribution to the knowledge of the orthoptera of that region. The weekly, sometimes daily, postal card bulletins which Mr. Scudder sent me during the process of identification, announcing progress and new discoveries, remain among my treasured mementoes of a delightful and all too brief association with one of the truly great men of his time.

SYNONYMICAL, AND OTHER NOTES ON THE TIPULIDÆ (DIPTERA).

By Charles P. Alexander,
Ithaca, N. Y.

The question as to whether, or not, the name *Limnophila*, Macquart (Nat. Hist. Dipt., Vol. I, p. 95, 1834) can be retained for the well-known genus of crane-flies, has faced every student of *Tipulidæ* since the time of Rondani. Rondani in his "Prodromus Dipterol. Italicæ" (Corrigenda, IV, 1861) stated that this generic name was preoccupied in the Mollusca and proposed the new name, *Limnomya*.

A careful study of conchological literature failed to find any mention of a *genus Limnophila*, but constant reference to a suborder of that name. G. W. Tryon, Jr., "Structural and Systematic

Conchology" (Vol. III, p. 92, 1884), gives *Limnophila*, Hartmann, as a synonym of the suborder *Hygrophila*, Ferrusac (order *Basommatophora*). Dr. Paul Fischer in his great work, "Manuel de Conchyhologie et de Paléontologie Conchyologique (Paris, 1887, p. 503) concerning the suborder *Hygrophila*, states that the suborder *Limnophila* is a synonym.

It is, of course, possible that a genus *Limnophila* was erected in the Mollusca in 1828, in which case the name of the Tipulid genus would become *Limnomya*, Rond., this being the first term applied to the genus as a whole, although the sub-genera *Elæophila*, Rondani ('56); *Lasiomastex*, O.S. ('60); *Prionolabis*, O.S. ('60); *Dactylolabis*, O.S. ('60) and *Dicranophragma*, O.S. ('60) were erected before this genus. One, *Idioptera*, Macq. (Nat. Hist. Dipt., I, p. 94) was proposed even before *Limnophila*. However, these names are used by many authorities as full genera, and by others as sub-genera, all applying to groups of species contained in the old genus *Limnophila*. If any change should have to be made, it would be better to use the name which first covers the genus as a whole.

If there is no genus *Limnophila* in the *Mollusca* prior to 1834, then the Tipulid name is perfectly valid because that section of the rules of nomenclature that deals with synonymy decrees that "the laws of synonymy appertain only to genera, subgenera, species and sub-species" and consequently the *Suborder Limnophila* is outside the field.

The late Mr. D. W. Coquillet on p. 590 of his invaluable publication, "The Type species of the North American genera of Diptera"[1] has placed the American species of the genus *Limnophila* in Bigot's genus *Phylidorea* (Bigot, Synoptic Table, etc., p. 456).[2] As explained by Osten Sacken (Studies on Tipulidæ, pt. II, p. 234, 235)[3] the genus *Phylidorea* is merely a synonym of *Limnophila*.

Bigot, l. c., p. 456, states that "the species of *Limnophila*, Macq., provided with a discal cell are my true *Tipulidæ* and receive the new generic name, *Phylidorea*, Bigot." But Osten Sacken, l. c., p. 235, remarks, "what species Mr. Bigot places in his genus *Limnophila* without discal cell is not explained in his paper and I am not aware of the existence of any such species."

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[1] Proc. U. S. Nat. Mus., Vol. 37, pp. 499–647 (1910).

[2] Bigot. Ann. Soc. Entom., France, pp. 447–482 (1854).

[3] Osten Sacken, C. R., Berliner Entom. Zeitschr., Bd. XXXI, Heft II, pp. 163–242 (1887).

Consequently, the species in the New World, as well as the Old, should be known as *Limnophila*, but it would be better to accept the prior name *Petaurista* (Meigen, 1800) as the tribal name, *i. e.*, *Petauristini* instead of *Limnophilini.*

There are a few corrections in synonymy to be made. *Tipula costalis*, Say of the Eastern United States (Jour. Acad. Nat. Sci. Philadelphia, III, 23.2, 1823) is preoccupied by *Macromastix costalis*, Swed. of Australia. (*Tipula costalis*, Swederus; Act. Holm, 286, 1787.) No other name seems to have been applied to the *costalis* of Say, and I propose the name *Tipula sayi*, nom. nov. (non *Oropeza sayi*, Johns). *Dicranomyia brunnea*, Grimshaw, of Hawaii (Fauna Hawaiiensis, III, 1901) is preoccupied by *D. brunnea* Doane (Eastern United States) (Jour. New York Ent. Soc. VIII, 1900) and its describer should propose a new name for the Hawaiian insect. In the "Type-species of Am. Dipt.," the late Mr. D. W. Coquillet states that the type of *Holorusia*, Loew, is *grandis*, Bergr. Bergroth (Ent. Tidskr, IX, 1888) proposed the name *grandis* to replace *rubiginosa*, preoc., on the grounds that *Holorusia* is not distinct from *Tipula*. If the genus *Holorusia* is to be considered as distinct as is done by Mr. Coquillet, the type is still *rubiginosa*, Loew, and not *grandis*, Bergr.

DESCRIPTIONS OF NEW SPECIES.

In the description of the following species of crane-flies, I have adopted many of the suggestions proposed by Mr. R. A. Muttkowski in his splendid article "The Composition of Taxonomic Papers." (Ann. Ent. Soc. Amer., June, 1911; Vol. II, No. 2, pp. 194–217). Concerning the thoracic structure, the terminology given by Mr. R. E. Snodgrass, "The Thorax of Insects and the Articulation of the Wings" (Proc. U. S. Nat. Mus., XXXVI, pp. 568, 569; pl. 62; figs. 173, 174; pl. 63, figs. 175–178) is largely used. The best paper on crane-fly genitalia, is, without question, that by Mr. Snodgrass on "The Hypopygium of *Tipulidæ*." (Trans. Am. Ent. Soc., XXX, June, 1904; pp. 179–236, pl. VIII, XVIII.) The terminology used therein has been adopted in the present paper, but it would be desirable could we have a common terminology for all of the Dipterous families, if not for all the orders of insects.

I wish to thank Dr. A. D. MacGillivary, of Illinois, for advise on certain points; Dr. J. C. Bradley, for the Georgia material herein included, and, especially, Dr. J. G. Needham for kind advice and assistance upon many points.

Limnophila similis sp. nov.

Male. Dark brownish-black; L. 7.5 mm.; wing, 9 mm. Rostrum brownish-yellow, darker at the tip; palpi dark brownish-black; front, vertex and genæ, light gray. Antennæ: first segment elongated, cylindrical, as long as segments two, three and four combined, brown; second segment, globular, reddish-brown; remaining segments generally similar to one another in shape, cylindrical, armed with long black verticils and clothed with a fine yellow pubescence.

Thorax: Pronotum, dark brown with a fine pubescence; mesonotum: anterior portion of the præscutum, glabrous, shining black; remainder with a yellowish-brown bloom; a regular V-shaped row of yellowish-brown hairs, extending from the caudal end of the naked patch described above, posteriorly to near the transverse suture; scutum, scutellum and postnotum with a gray bloom, the scutum with scattered hairs; scutellum with a transverse row of yellowish-hairs along the caudal margin. Metanotum gray. The pleuræ dull yellowish-brown; venter, pale yellow, its sides with a gray bloom. Halteres, pale yellow, the knobs darker, brown. Legs: coxæ, bright yellow; femora, yellow, tipped with brown; tibiæ, brownish-yellow, extreme tip darker; metatarsus yellowish-brown, the remainder of the tarsi, dark brown.

Abdomen, dark brown, densely covered with long, pale brown hairs, the genital segment brighter brown. Genitalia: the pleura is moderately long, thickly armed with very long dark brown hairs; these hairs as long as the apical appendages. The dorsal apical appendage, pointing meso-caudad, chitinized at the tip, toothed; the ventral appendage thickened at the base, the slender apical portion short, directed caudad. (See fig. 8.)

Wings of a whitish color; cells C and Sc tinged with yellow; stigma, brown; basal deflection of R_{4+5}, base of R_s and the deflection of Cu_1 with brown clouds; distal portion of cells 2d R_1, R_2, R_3 and R_5, tinged with darker. Venation: almost exactly as in *L. adusta*, O.S., both agreeing in the following essentials: R_s very short, arcuated at its origin; R_3 rather short, oblique, with the radial cross-vein near its middle and at the tip of R_1; 2d Anal similar in the two species. (See fig. 4.)

Female. Similar to the male; L. 8–9 mm.; w. 10–10.5 mm. Generally similar to the male, but the mesothoracic scutum and scutellum are covered with a yellowish-brown bloom; postnotum with a gray bloom; abdomen pale yellow with light brown apical rings on the segments; abdomen beneath, light yellow with brown caudal margins to the segments.

Limnophila similis is allied to *adusta*, O.S., but is much darker in coloration, dark brown, not red or yellow. In *adusta*, the ventral apical appendage of the male hypopygium (see fig. 9) is thickened on both sides of the base; in *similis* (see fig. 8) the thickening is all on one side (cephalic margin in the normal position of rest). The slender portion of this appendage is much longer than the thickened base in *adusta*, shorter than this base in *similis*. The dorsal appendage in *adusta* is long, slender, thickened on the inner margin of the chitinized tooth, in *similis* much shorter. The gonapophyses are much smaller in *similis* than in *adusta*, but have not yet been studied critically.

Holotype: male; Johnstown, N. Y. (Hale's Creek) June 10, '10.

Allotype: female; with the type.

Para-type: female; Johnstown, N. Y., June 26, '10.

Swept from vegetation near water; Coll. C. P. Alexander.

Limnophila noveboracensis sp. nov.

Male and *female*. Brownish-yellow; legs, yellow; L. male, 5.2–5.8 mm. Female 7–8 mm.; W. male, 6.5 mm.; female, 7–7.5 mm.

Rostrum, light brown; palpi with numerous long hairs, brown; front and vertex yellow with a light gray bloom, producing a silvery effect. Antennæ: 1st segment, elongate, cylindrical; 2d, more globular, both segments brown, armed with scattered black hairs; segments of the flagellum becoming gradually more and more elongated and slender, yellowish-brown, with a rather short pubescence and long scattered verticils. Front, vertex and the prolonged occiput, thickly beset with long, brown hairs.

Thorax: surface opaque; Pronotum, brownish-yellow; the neck with a gray pubescence. Mesothorax: præscutum, yellowish-brown; a distinct humeral pit on the latero-anterior margin, brownish-black; no distinct thoracic stripes; a conspicuous double dot near the cephalic margin of the præscutum. Remainder of the mesothoracic and the metathoracic dorsums, light brownish yellow. Pleuræ pale brownish-yellow. Halteres pale, the distal portion of the knob darker. Legs: coxæ yellow; femora and tibiæ pale yellow, the extreme tips barely darker; tarsal segments excepting the metatarsus, yellowish-brown.

Abdomen hairy, brownish above, paler, yellowish, beneath; genitalia, light.

Wings hyaline, or nearly so; stigma indistinct; veins pale brown. Venation: Sc long, extending almost to the inner margin of cell R_3. Sc_1 about twice the length of Sc_2. R long, the cross-vein *r* far from its tip, at least twice its own length. R_s long, gently arcuated at its origin; petiole of cell R_2, short, from one-fourth to two-fifths as long as vein R_2; R_3 long, sinuate; R_{4+5} between R_s and the cross-vein *r-m*, longer than this cross-vein. M_3 beyond the cell 1st M_2, longer than this cell.

Basal deflection of Cu_1 anterior to the middle of cell 1st M_2. R_{2+3}, so arcuated that R_s is not in a direct line with R_3. 2d Anal vein curved sharply inward at its tip. Cell R_3 is decidedly anterior to cell R_5 and about on a level with cell 1st M_2. M_{1+2} fused to the wing-margin, eliminating cell M_1. (See fig. 3.)

Limnophila noveboracensis comes in the same category with *lenta*, O.S., *quadrata*, O.S.; *nigrilinea*, Doane and *antennata*, Coq. in that it lacks cell M_1. It differs from these species as follows:

L. lenta, O.S. (fig. 1) (E. U. S.) has: Sc_1, slightly longer than Sc_2; petiole of cell R_2 (R_2+_3) rather long, two thirds the length of R_2; cross-vein *r* usually just beyond the fork; vein R_2 short, oblique; R_s almost on a straight line with R_3; cells R_3, R_5 and 1st M_2 all on a level; distal portion of vein M_3 rarely longer than cell 1st M_2; R_s usually short, arcuated at origin; coloration, ochraceous-yellow.

L. quadrata, O.S. (fig. 2) (E. U. S.) has: Sc_2 longer than Sc_1; petiole of cell R_2 (R_2+_3) nearly as long as R_2; the cross-vein *r* inserted just beyond the fork; vein R_2 short, oblique; R_s in a straight line with R_3; cells R_3, R_5 and 1st M_2 all on a level; distal portion of vein M_3 about as long as cell 1st M_2; R_s long, gently arcuated near its origin; coloration yellowish-gray.

L. nigrilinea, Doane (Jour. N. Y. Ent. Soc., VIII, p. 190) (W. U. S.; Olympia, Wash.) has: Petiole of cell R_2 one and one half the length of the basal deflection of Cu_1; cross-vein *r* slightly removed from tip of R_1; cell R_3 slightly anterior to cell R_5; general color yellow, with a black dorsal band. L. (female) 12 mm.; distal portion of wings pubescent.

L. antennata, Coq. (Jour. N. Y. Ent. Soc., XIII, pp. 58, 59) (W. Am.; Brit. Col.) has: Petiole of cell R_2 obliterated or nearly so; cross-vein *r* at the tip of R_1; cell R_3 slightly anterior to cell R_5; general color black; antennæ of the male long, reaching the base of the 6th abdominal segment.

Although *noveboracensis* agrees, superficially, with *lenta* and *quadrata*, it belongs to a very different group of species. In all respects except the presence of cell M_1, this species is a typical member of the *luteipennis* group of the genus. The four species, *luteipennis*, *contempta*, *inornata* and the present species, agree in possessing the following group characters: Structure of the head, narrowed and prolonged behind; neck produced forewards to meet the caudal portion of the head; structure of the antennæ; the pronounced humeral pits, and the double dot on the mesothoracic præscutum; venation; cell R_3 longer than cell R_5; vein R_3 arcuated; 2d A strongly incurved at tip, etc.

Holotype: male. Sacandaga Park (Fulton Co.), N. Y., along the R. R. embankment, June 28, 1911.

Allotype: female; with the Holotype.

Para-types: 3, in the type-locality, June 21, '11.

Para-types: 10, in the type-locality, June 28, '11.

Para-types: 3, Coy Glen, Ithaca, N. Y.; July 11, '11.

Common on rank vegetation, usually near running water; Coll. C. P. Alexander.

L. noveboracensis is common, and apparently widely distributed in the North. The type locality is in the Southern Adirondack Mts. (N. Y.). The species is common about Ithaca, N. Y. (Coy Glen), and there are specimens in Dr. Needham's collection labelled "Walnut Lake, Mich., July 8, 1906." It has probably been confused with *L. quadrata* in collections. The figure in Dr. Needham's Report on the Crane-flies of New York (23d Rept. of the N. Y. State Entomol., pl. 18, fig. 6) is not *quadrata* but belongs to this new species. The specimen of *L. luteipennis*, mentioned by Osten Sacken (Monographs, etc., IV, p. 218) where he says "I possess a specimen without petiolated (second) posterior cell in both wings" may possibly belong to *noveboracensis.*

Limnophila (Prionolabis) simplex sp. nov.

Male. Dark brown; L. 11 mm.; w. 11.5 mm. Described from an alcoholic specimen. Rostrum pale; palpi brown; front, occiput and vertex, dark brown; antennæ, dark brown.

Thorax: pronotum, dark brown. Mesonotum, præscutum and scutum dark brown, the scutellum lighter brown. Metanotum dark brown. Pleuræ dark brown. Halteres uniformly pale. Legs: coxæ brown; trochanters brownish-yellow; base of femora, brownish-yellow, gradually darker to the tip; tibiæ, yellowish-brown, the tip suddenly darker; tarsi dark brown.

Abdomen: dorsum, light reddish-brown, the 8th segment rather darker; hypopygium, brown, the pleura medium-brown, paler mesally; apical appendages yellow with the tips chitinized, brownish-black. Genitalia: hypopygium, tergal portion rather deeply notched, the notch obtuse, the sides produced posteriorly into short blunt points; pleura, rather short, armed with long, numerous black hairs. The apical appendages two, the ventral one produced posteriorly, elongate, toothed along the inner face of the tip; teeth relatively few, one tooth, near the middle, relatively larger than those below it. The anterior, or dorsal apical appendage is simple, unarmed, projecting mesally, curved so that the tip projects slightly caudad. The Anal tube is long, almost concealing the guard of the penis; the second gonapophyses are long and slender; the guard of the penis is bent strongly ventrad near its tip. (See fig. 10.)

Wings: light yellowish-gray, the cells all uniform in coloration; stigma rather indistinct, gray; a pale gray cloud at the base of R_s; pale clouds along R_{2+3}, basal deflection of R_{4+5}, cross-vein *m*, deflection of M_{1+2}, and along the basal deflection of Cu_1; Cu tinged with brown. Venation as in *Limnophila rufibasis,* O.S. to which this species is related.

This species belongs to the sub-genus *Prionolabis,* O.S., and is closely related to L. (*P.*) *rufibasis,* O.S. of the Eastern States. It differs in the following respects: L. *rufibasis* has the costal and subcostal cells much richer yellow than the other cells of the wing; stigma clear-cut, dark brown; markings along the cord of the wing and along Cu, much darker. Base of the femora bright yellow, not tinged with brown. The deciding difference lies in the shape of the anterior apical appendage of the male genitalia, which, in *rufibasis* (See fig. 11) is bifurcated with the ventral arm toothed, whereas in *simplex* (see fig. 10), it is simple. The species, L. *munda,* O.S., which is also referred to the subgenus *Prionolabis* is very distinct from either of the above.

Holotype: male, Gainesville, Ga., April 2, 1911; Coll. J. C. Bradley.

It is probable that some of Osten Sacken's specimens of *rufibasis* (*Monographs,* etc., IV, p. 226) belong to this new species, as he says "the wings are more yellowish in the larger specimens and more grayish in the smaller ones." The drawing of the genitalia (id., pl. IV, fig. 27) is highly diagrammatic.

Polymera georgiae sp. nov.

Male. Dark brownish black; L. 4.2–5 mm.; w. 5 mm., ant. 5.75 mm. Described from alcoholic specimens.

Rostrum and palpi, light brown; front and vertex, dark brown; eyes, black, the ommatidia large, few in number; antennæ: first segment, short, round, brown; second segment, rounded, brown; third, very elongated, cylindrical, brownish-yellow, the tip, pale, whitish; segment with short scattered hairs and a few long delicate ones; segment 4 to 16, generally similar to one another in shape, elongate-cylindrical, swollen near each end, the swellings armed with short, scattered hairs and on the third to fifth segments with scanty long delicate ones; segments brown, pale at the ends producing an annulated effect.

Thorax: pro-, meso-, and meta-nota, as well as the pleuræ, dark brownish-black. Halteres brownish-yellow, the knob large, darker. Legs: anterior pair, coxæ brown, trochanters light brown; femora, light brown, with a dark sub-apical ring, the extreme tip yellowish white; extreme base of the tibiæ, yellowish white, remainder of tibiæ, brown; tarsus light yellow, the base of the metatarsus rather darker. Middle pair: femora brown, darkest before the tip; tip abruptly whitish yellow; tibiæ and tarsi as in fore legs. Posterior pair: coxæ brown; femora brown, with a darker subapical band; tip yellowish-white; base of tibia yellow; remainder brown; tarsi, yellowish-white, the terminal segments somewhat darker.

Abdomen dark brownish-black with long conspicuous hairs.

Wings: grayish brown throughout; venation: quite similar to P. *albitarsis.* Will. (Dipt. St. Vincent; P. 296, 297; Pl. 10, fig. 71) (Copied in Needham, Crane-flies (23d Rept. St. Ent. N. Y.; Pl. 21, fig. 2) and Williston, Manual of N. Am. Dipt. (1908); p. 85, fig. 28). However the longitudinal veins in the distal portion of the wing are much longer than there shown, the free portions of M_3 and Cu, longer, the basal deflection of Cu_1 beyond the fork of M, not at it, etc. (See fig. 5.)

This species differs from *P. albitarsis* Will. (Is. St. Vincent), in the conspicuous annulated antennæ, darker color of the thorax and other colorational differences. From the unsatisfactory description of *P. fusca*, Wied. (Brazil) (Wiedemann, Aussereuropäische zweifl. Inseckt, Vol. I, p. 58, pl. VI b, figs. 3 and 4) it differs in the color of the antennæ and feet, and, if the drawing is accurate, in venation. *P. obscura*, Macq. is similar to *fusca* and considered a synonym by Kertesz. *P. hirticornis*, Fabr. (S. America) has white bands on the wings.

The genus is new to the Nearctic fauna, having been recorded, hitherto, only from South America and the Lesser Antilles.

Holotype: male, St. Simon's Is., Ga., April–May, 1911. Coll. J. C. Bradley.

Para-types: 2 males, with the holotype.

Ormosia apicalis sp. nov.

Male. Yellow and brown; L. 4.5 mm.; w. 5.25 mm. Described from an alcoholic specimen.

Rostrum and palpi brown; front, vertex and occiput, yellowish-brown; antennæ: 1st segment of the antennæ, elongate, cylindrical; second globular; 3d to 8th oval, generally similar to one another in shape; remainder elongated, the segments covered with a short pubescence, and long, scattered hairs; antennæ, pale yellowish-white.

Thorax: Pronotum grayish-white. Mesonotum: præscutum yellow with two indistinct brown lines running forwards from the ends of the arms of the V-shaped suture; these lines with numerous black hairs which meet in front of the suture; an indistinct brown median line; scutum yellow with a row of hairs on either side leading from the ends of the V-shaped suture toward the wing-roots; scutellum whitish-yellow, thickly set with dark hairs; postnotum very pale, almost white.

Metanotum yellow; pleuræ whitish with a tinge of brown. Halteres, pale. Legs, brownish-yellow throughout.

Abdomen, dark brown, pleuræ somewhat paler; genital segment yellow, tinged with brown in the apical half.

Wings: hyaline, the costal margin somewhat darker. A large, dark spot above the base of the R_S, a second surrounds Sc_2 and a third at the tip of Sc_1, extending down over cross-vein *r*. The whole apical portion of the wing from the stigma down to the median veins is blackish. Dark clouds on the basal deflection of Cu_1 and cross-vein *r–m*; base of wing between R and Cu dark; veins brown; deflection of M_{1+2}, very pale. Venation (see fig. 6): Sc long, Sc_1 ending at a point slightly anterior to the cross-vein *r*. Sc_2 remote from the tip of Sc_1, about midway between that point and the base of R_S. R_S long, feebly arcuated. Cross-vein *r* far back from the tip of R_1 and just beyond the fork of R_{2+3}. R_{2+3} longer than the basal deflection of Cu_1. Cell 1st M_2 closed. Basal deflection of Cu_1 anterior to the fork of M. (Most of the pubescence of the wing disc has become detached due to its being in alcohol with other specimens.)

This species does not seem very closely related to any of the described American forms. The three species with spots on bands on the wings, *innocens*, O.S., *fascipennis*, Zett., and *nubilus*, O.S. are quite distinct in that the spotted and banded effect is brought about by dark hairs, and not by the color of the membrane itself, as in *apicalis*. It agrees with *innocens* in the essential features of venation, closed cell 1st M_2, divergent Anal veins, etc.

Holotype: male, Burton, Ga. (May 20, 1911); Coll. J. C. Bradley.

Furcomyia monticola sp. nov.

Male and *female*. Light yellow and brown; L. male 6–6.5 mm.; female, 7.5–7.8 mm.; w. male, 6.5 mm.; female 7 mm.

Rostrum brownish-yellow; palpi brown, the first segment lighter colored. Front and vertex, brown. Antennæ: first segment, cylindrical, light yellow, with a few scattered black hairs; remaining segments rounded-oval, almost moniliform, brown.

Thorax: Dorsum light yellow, marked with brown. Pronotum, very light brown medially. Mesonotum: a straight band of brown beginning near the cephalic margin of the præscutum, running backward and expanding out over the caudal portion of the sclerite, in the middle ending just before the V-shaped suture on the sides running to the suture and meeting the mark on the scutum; scutum with two lunate brown marks on each side of the yellow median line; scutellum largely brown; postnotum brown, yellow on the cephalic margin. Metanotum brown. Pleuræ clear light yellow, unmarked. Halteres pale, knob slightly darker. Legs light yellow throughout, with numerous black hairs.

Abdomen: dorsum yellowish-brown, the joints of the sclerites darker. Ventral surface light yellow; genitalia brownish-yellow. Genitalia of male. (See figs.

12, 13.) The ventral soft fleshy lobes, very large, resembling boxing gloves in shape, covered with scattered hairs pointing posteriorly. From its inner margin, pointing inwards, is a slender arm, terminating in a stout chitinized tooth, armed with denticulæ along the cephalic margin; on the caudal margin of this arm, and pointing posteriorly, are two stout bristles. The dorsal arm is chitinized, rather slender, the free portion short, curved, pointing cephalad. The guard of the penis, when viewed from above, is almost straight, the second gonapophyses pointing inwards. Viewed from the side, the penis-guard is strongly decurved ventrally, with a protuberence beyond the middle on the ventral side; the second gonapophyses, conical, pointing ventrad and armed with numerous hairs at the tip.

Wings: hyaline; stigma light brown, distinct. Venation (see fig. 7); Sc moderately long, the fork at the origin of R_s, or (usually) somewhat beyond it. Sc_1, from one to two times as long as Sc_2. Cross-vein *r* at the tip of R_1. Deflection of R_{4+5} about one half as long as R_s. Basal deflection of Cu_1 at the inner end of cell 1st M_2. Cross-vein *m* present, closing cell 1st M_2.

On some of the cotype males, the basal deflection of Cu_1 is anterior to the fork of M.

This species comes nearest to *F. moniliformis*, Doane (Jour. N. Y. Ent. Soc., 1900, p. 184, pl. VII, fig. 8) but differs in the following particulars: antennæ and palpi brown; markings on thoracic dorsum very different, as well as decided differences in color of legs, abdomen, wings, etc. Sc_1 ends beyond the origin of R_s, never before it; no pubescence in distal portions of the wings, etc. The forceps of the male are notable and agree in some respects with the brief description of this part in *haeretica*, O.S. (Monographs IV, p. 70.)

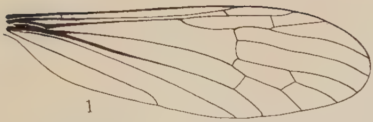
Holotype: male, Black Rock Mt. (Rabun Co.) Ga., alt. 3,000 ft., May 24, '11. Coll. J. C. Bradley.

Allotype: female; with the holotype.

Para-types: 7 males, 1 female, with the holotype.

EXPLANATION OF PLATE

1. *Limnophila lenta*, O.S.; wing. (Ithaca, N. Y., Aug. 12, '10.)
2. *Limnophila quadrata*, O.S.; wing. (Ithaca, N. Y., May 21, '11.)
3. *Limnophila noveboracensis* sp. nov. Para-type; wing. (Ithaca, N. Y., July 11, '11.)
4. *Limnophila similis* sp. nov. Para-type; wing. (Johnstown, N. Y., June 26, '10.)
5. *Polymera georgiæ* sp. nov. Para-type No. 2, wing. (St. Simon's Is.; Ga., April–May, '11.)
6. *Ormosia apicalis* sp. nov. Holotype, wing. (Burton, Ga., May 20, '11.)
7. *Furcomyia monticola* sp. nov. Para-type, wing. (Black Rock Mt., Ga., May 24, '11.)



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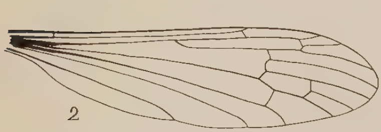

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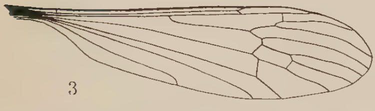

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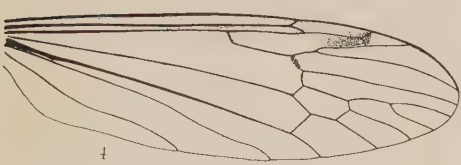

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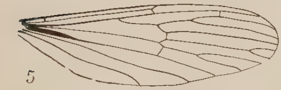

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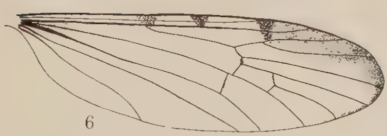

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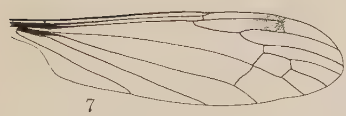

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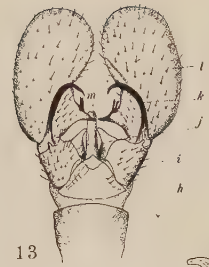

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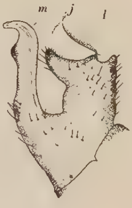

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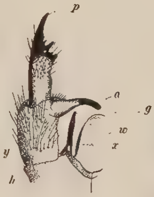

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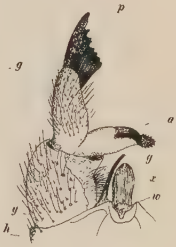

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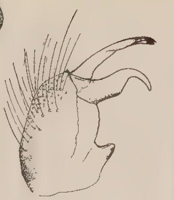

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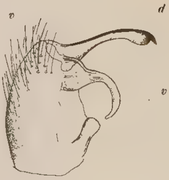

9

ALEXANDER—TIPULIDÆ

8. *Limnophila similis* sp. nov. Holotype, male genitalia. (Johnstown, N. Y., June 10, '10.)

Pleura of the hypopygium; left side; ventral aspect. d. dorsal apical append.; v. ventral ap. app.

9. *Limnophila adusta,* O.S. Male genitalia. (Ithaca, N. Y., July 16, '11.)

As in No. 8 (*similis*).

10. *Limnophila simplex* sp. nov. Holotype, male genitalia. (Gainesville, Ga., April 2, '11.)

Pleura of the hypopygium; right side; dorsal aspect. p. posterior, or ventral apical app.; a. anterior, or dorsal apical app.; g. 2d gonapophyses; h. hypopygium; w. anal tube; x. guard of the penis; y. pleura.

11. *Limnophila rufibasis,* O.S. Male genitalia. (Ithaca, N. Y., May 22, '11.)

As in No. 10 (*simplex*).

12. *Furcomyia monticola* sp. nov. Holotype, male genitalia. (Black Rock Mt., Ga., May 24, '11.)

Hypopygium, lateral aspect.

m. guard of the penis. j. 2d gonapophyses. l. ventral apical app.

13. *Furcomyia monticola* sp. nov. Holotype, male genitalia hypopygium; dorsal aspect.

h. hypopygium; i. pleura; j. 2d gonapophyses; k. dorsal apical app.; l. ventral apical app.; m. guard of the penis.

THREE NEW ANTS FROM MEXICO AND CENTRAL AMERICA.[1]

By William Morton Wheeler.

Pheidole tisiphone sp. nov.

Soldier. Length 5.6 mm.

Head large; from above subrectangular, longer than broad, a little broader in front than behind, with nearly straight sides and very feebly excised posterior broader and a short, shallow occipital groove; in profile truncated anteriorly, flattened above in front and feebly convex below, with a narrow and very deep scrobe on each side, running obliquely backward and downward just over the eye to the outer border of the gula and ending abruptly at the middle of the head. The edges of the scrobes are sharp and parallel, the upper edges passing anteriorly into the frontal carinæ which are very widely separated. Frontal area small, deeply impressed, rounded behind. Frontal groove obsolete. Eyes small, about 1-6 the distance from the anterior to the posterior border of the head. Clypeus short and very convex, with a faint, median, longitudinal impression, and entire and deflected anterior border. Mandibles very convex, with two large, incurved apical teeth. Antennæ very short and slender, the scapes curved, but scarcely flattened, less than half as long as the scrobe; funicles longer than the scapes; all their joints longer than broad. Thorax robust, especially in front, without humeral callosities; pro- and mesonotum in profile forming a simple subangular convexity, without a constriction at the pro-mesonotal suture; mesoëpinotal constriction well-developed; epinotum small, its base and declivity sloping, not separated by an angle; spines short, slender and rather blunt, longer than broad at their bases, directed upward and slightly backward, less than half as long as the distance between their bases. Petiole from above about 1½ times as long as broad, broadest behind, with concave sides, its node rather high, strongly compressed anteroposteriorly, in profile with concave anterior and posterior declivities and seen from behind with straight, entire upper border. Postpetiole 1½ times as broad as the petiole, convex above, nearly twice as broad as long, with the sides projecting as blunt angles, which are rounded in front and slightly concave behind. Gaster smaller than the head, elliptical. Legs long and stout, with distinctly incrassated femora.

---

[1] Contribution from the Entomological Laboratory of the Bussey Institution, Harvard University, No. 51.

Whole surface, especially that of the gaster, shining. Mandibles coarsely striatopunctate. Clypeus transversely rugulose-punctate. Head in front longitudinally punctate, transversely and arcuately rugulose on the posterior two thirds except the posterior corners which are rather densely reticulate-rugose. Gular surface more shining, punctate. Thorax above, including the epinotal declivity, transversely rugose, pleuræ shining, more indistinctly rugose. Petiole and postpetiole rather smooth, the latter coarsely punctate on the sides. Gaster and legs glabrous, with small, indistinct, scattered piligerous punctures.

Body, legs and scapes covered with very long, suberect, golden yellow hairs, which are very abundant on the upper surface of the head and clypeus and sparser elsewhere. The hairs on the upper surface of the head are directed backward, those on the clypeus, mandibles and gula forward.

Ferruginous red; legs slightly paler and more yellowish; gaster, borders of mandibles, clypeus, gula and antennal scrobes, black.

Described from a single worker taken by Mr. Frederick Knab at Almoloya, Oaxaca, Mexico (Nat. Mus. Coll. Type No.). Two workers taken by the same collector in the same locality may belong to this species but they are so unlike the soldier that I deem it best not to describe them.

This extraordinary species is very distinct from all the species of the genus known to me. In the possession of deep antennal scrobes running obliquely downward to the sides of the head, it resembles *Ph. aberrans* Mayr of South America and *Ph. scrobifera* Emery of Costa Rica; but the head in these species is much shorter and of a very different shape, the scrobes are shallower and broader, the pilosity and color are very different, and the latter species measures only 2.75 mm. *Ph. cavifrons* Emery of Uruguay seems to be an allied form but although the head resembles that of *Ph. tisiphone* in outline, the sculpture is very different and the length of the body is only 3 mm.

Macromischa lævissima sp. nov.

Worker. Length 1.6 mm.

Head, excluding the mandibles, nearly as broad as long, with feebly convex sides, rounded posterior corners and convex posterior border. Mandibles convex, with two large apical and 3 or 4 minute, indistinct basal teeth. Eyes rather large, convex, situated a little in front of the middle of the head. Clypeus, convex, with rounded, entire anterior border and a median longitudinal impression bounded on each side by a narrow, rather distinct ridge. Frontal area obsolete. Frontal carinæ short, feeble and parallel. Antennæ rather slender; scapes reaching to the posterior border of the head; funicle with a 3-jointed club as long as the remainder of the funicle; its first joint fully as long as joints 2–4 together; joints 2 and 8 as long as broad, joints 3–7 a little broader than long, joints 9 and 10 together shorter than the terminal joint. Thorax narrower and a little longer than the head with the mandibles, from above somewhat broader in front than behind, with rounded humeri, in profile evenly rounded dorsally, without sutures or constrictions; epinotum depressed and sloping, without distinct base and declivity, armed with two rather long, slender, acute spines, which are directed backward and outward and slightly upward, closely approximated at their bases and with their tips very slightly deflected. Petiole with a long, slender peduncle and an erect node at its posterior end. This node is nearly as high as the length of the peduncle, strongly compressed anteroposteriorly with rounded upper border and flat anterior and posterior surfaces, the former passing over rather abruptly into the horizontal dorsal surface of the peduncle. Postpetiole from above a little broader than the petiole, broader than long, subrectangular, nearly as broad in front as behind; in profile its node is convex though much lower than the node of the petiole. Gaster elliptical, with broadly excised anterior margin and feebly convex sides and dorsal surface. Legs rather long; middle and hind femora incrassated.

Surface very smooth and shining; mandibles, sides of clypeus and cheeks finely and sharply striated; surface of head, thorax and gaster with much scattered, minute piligerous punctures.

Hairs white, very short, erect and scattered, obtuse on the body, slender, pointed and appressed on the legs and antennal scapes.

Black; mandibles, antennæ, petiole and postpetiole dark brown; tibiæ and tarsi, brownish yellow.

Described from a single specimen taken by Prof. A. Petrunkewitch at La Buena Ventura, near Santa Rosa, Vera Cruz, Mexico.

M. lævissima is the smallest known species of the genus. It is closely related to the Texan *M. subditiva* Wheeler and goes down to it in my table of *Macromischa* (Bull. Amer. Mus. Nat. Hist.

XXIV, 1908, p. 141). This latter species, however, is larger, its head and thorax are not glabrous but rugulose, its epinotal spines are somewhat shorter and stouter, and the erect, obtuse hairs on the body are much longer and more abundant.

Apterostigma calverti sp. nov.

Worker. Length 3.5–4 mm.

Head, excluding the mandibles about 1½ times as long as broad, with rather straight, parallel sides and broadly rounded, convex posterior portion, suddenly contracted into a short neck without a reflected posterior edge. Vertex with a feeble longitudinal impression in the middle. Eyes convex, at the middle of the sides of the head. Clypeus about twice as long as broad, with broadly rounded, entire anterior border. Mandibles with 7–9 teeth, the two apical ones largest. Frontal carinæ in front with large, thick lobes, behind continued as diverging ridges which are shorter than the lobes. Antennæ robust; scapes surpassing the posterior border of the head by about ¼ their length, first funicular joint as long as joints 2–4 together; joints 2–9 not longer than broad. Thorax rather stout; pronotum with prominent, reflexed cervical border, behind with a transverse convexity which is continued down onto the mesopleura as a distinct, rounded ridge; mesonotum with a pair of very distinct, subparallel, longitudinal ridges, more approximated in the middle; base of epinotum with a similar pair of ridges which are shorter, more closely approximated and more nearly parallel. In profile the base of the epinotum is moderately convex and longer than the concave declivity with which it forms a rounded angle. Constriction between meso- and epinotum much the same as in other species, but with a short ridge on each side. Epinotal stigmata very prominent. Petiole from above about twice as long as broad, broadest behind and growing gradually narrower anteriorly as far as the stigmata where it narrows more suddenly to the insertion in the epinotum. In profile the node is low and rounded, about half as high as the length of the petiole, with long, straight anterior and more abrupt, slightly concave, posterior slope. Postpetiole as long as broad, campanulate, broadest behind, with rounded sides, very feebly excised posterior border and a very feeble dorsal impression behind. Gaster elliptical, without a longitudinal ridge on each side of the first segment. Legs long and rather stout.

Mandibles glossy, with smooth and shining dentate border, the remaining surface finely striated and finely and sparsely punctate. Antennal funiculi slightly shining; body scapes and legs very opaque and very finely and densely punctate; the head, thorax, petiole, postpetiole and gaster being also rather coarsely reticulate-rugose.

Hairs much as in other species; black at the base with grayish or yellow tips, coarser and more appressed than in *wasmanni*, scarcely curved at the base on the tibiæ and scapes. Pubescence fulvous, sparse and very short.

Black or dark brown; mandibles, funiculi, tarsi and articulations of the legs, petiole and gaster ferruginous; mandibular teeth black; impressions between the ridges on the thorax not paler than the surrounding surfaces.

Female. Length 4.5 mm.

Closely resembling the worker, but with the neck like posterior portion of the head much longer and the eyes larger. Mesonotum above with four longitudinal welts, the two lateral of which are short and feeble and cover the paraptera, while the two median are longer. Scutellum behind bearing two flat, blunt teeth which are as long as broad at their bases. Epinotum in profile with subequal base and declivity, both flattened and meeting to form an obtuse angle. Seen from above the base bears a pair of longitudinal ridges like those of the worker.

Sculpture, pilosity and color as in the worker. The hairs are, perhaps, shorter and more appressed on the head and thorax. Wings opaque, gray, with yellow stigmal region and two sharply defined, elongate black spots, one at the base and the other between the two branches of the cubital vein.

Described from twelve workers, one deälated and five winged females taken by Dr. P. P. Calvert from two colonies in the Banana River District and Juan Viñas, Costa Rica, during October and November, 1909. Both the colonies from which the specimens were taken had constructed their fungus-gardens between the overlapping leaves of Bromeliads growing on trees 10–15 feet above the ground. One of the Bromeliads was also tenanted by a caterpillar and the larva of an interesting dragon-fly (*Mecistogaster modestus*). Fragments of one of the fungus-gardens, preserved in alcohol with the ants, seemed to present the same primitive development of the hyphal swellings ("ambrosia") growing on a substratum of insect (beetle?) excrement as described by Moeller for some of the South American species of *Apterostigma*. The gardens of all previously described species of this genus have been found either in rotting wood or under stones. The unusual situation of the gardens of the new species may account for its having been overlooked by the many diligent collectors of Central American Formicidæ.

A. calverti is most closely related to *A. wasmanni* Forel, but differs in its much darker color, coarser sculpture and pilosity, in the shorter backward continuations of the frontal carinæ, and in lacking the longitudinal lateral ridges on the first gastric segment. The following table will serve for the identification of the workers of the known species of the genus, with the exception of the Mexican *A. scutellare*, which is known only from a single male specimen:

1. Head gradually constricted behind into a narrow neck, which has a distinctly reflected or expanded posterior edge........................2

Head suddenly constricted behind, without a neck or with a short neck, the posterior edge of which is not reflected or expanded............4

2. Petiole scarcely more than twice as long as broad; joints 2–9 of the funiculus not or very slightly longer than broad........................3

Petiole three times as long as broad; all the funicular joints distinctly longer than broad. Length 6–6.5 mm. Trinidad...........**urichi** Forel.

3. Neck rather short and but slightly reflected at its posterior edge; funicular joints 2–7 not longer than broad. Length 3.5–4 mm. Brazil..**pilosum** Mayr.

Neck longer and more distinctly reflected at its posterior edge; funicular joints 2–7 longer than broad; antennæ and petiole more slender; hairs on body and legs longer and less appressed. Length 4.6 mm. Costa Rica......................................**collare** Emery.

4. Head without a neck. Length 3.5 mm. Buenos Aires.....**steigeri** Santsche.

Head with a short but distinct neck.................................5

5. Postpetiole longer than broad; body slightly shining, dirty brown, with ochre yellow antennæ, mandibles and legs. Length 3.2–3.5 mm. Brazil..**mœlleri** Forel.

Postpetiole broader than long, body opaque..........................6

6. Ridges on meso- and epinotum feebly developed.........................7

Ridges on meso- and epinotum strongly developed.....................8

7. Funicular joints 3–7 a little longer than broad. Length 6 mm. Costa Rica..**robustum** Emery.

Funicular joints 3–7 broader than long. Length 3.4–3.5 mm. Trinidad..**mayri** Forel.

8. Ferruginous; body indistinctly reticulate-rogose; first gastric segment with well developed lateral ridges; posterior diverging portions of frontal carinæ longer than the lobes; hairs on antennal scapes and tibiæ curved at the base. Length 3.5–4 mm. Brazil...**wasmanni** Forel.

Black or dark brown; body more distinctly reticulate-rugose; first gastric segment without lateral ridges; posterior diverging portions of frontal carinæ shorter than the lobes; hairs on antennal scapes and tibiæ not curved at the base. Length 3.5–4 mm. Costa Rica..**calverti** sp. nov.

BOOK REVIEW.

THE REDUCTION OF DOMESTIC MOSQUITOES.

Instructions for the use of municipalities, town councils, health officers, sanitary inspectors, and residents in warm climates. By Edward H. Ross, pp. x–114, Figs. 22. P. Blakiston's Son & Co., Philadelphia.

The domestic mosquito is dangerous and should be exterminated in our towns and cities. This is the message which Edward Ross's new book entitled, "The Reduction of Domestic Mosquitoes" conveys. It does more than this, however, by convincing us that it can be accomplished, for Edward Ross, after battling with the ignorance of natives and the most adverse political conditions succeeded in exterminating the Culicines as well as the Anophelines in Cairo and Port Said.

The first half of the book is concerned with the life histories of the Culicines and the diseases which they spread; the second half with the means used in interesting the people and the practical methods adopted towards exterminating the pests.

"Deal with the domestic mosquito whether the Anopheline is present or not in the town." *Culex fatigans* may not be dangerous in a certain locality while *Stegomyia calopus* and the Anophelines are rapidly spreading diseases. Yet if *Culex fatigans* is permitted to thrive, people will continue to be bitten, and the work will fall into ill repute. It must not be forgotten that all mosquitoes are alike to the average person. Culex is, however, usually dangerous, a fact which Ross emphasizes repeatedly. This insect is known to spread some diseases and probably does more harm than we are aware of owing to the fact that the understanding of so many illnesses, especially those of warm climates, are as yet in their infancy.

This book is written in a popular way, even quite humorously at times, and is intelligible to laymen as well as to professional guardians of the public health. For this reason its good effects should be far reaching if the work is widely read.

R. W. Glaser,
Bussey Institution.

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ERRATA.

Article on "Tipula fallax and others," by R. W. Doan in the October Psyche.

p. 160, line 13, for impossible, read possible.
p. 161, line 1, for olia, read alia.
p. 161, legend of figure, for olia, read alia.

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